



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|---------------------------|---------------------|------------------|
| 10/666,595 | 09/18/2003 | Elliott Malcolm Philofsky | ACR-0301 | 8539 |
| 7590 | 08/11/2004 | | EXAMINER | |
| Law Office of Dale B. Halling, LLC Suite 311 24 South Weber Street Colorado Springs, CO 80903 | | | | THOMAS, ERIC W |
| | | ART UNIT | PAPER NUMBER | 2831 |

DATE MAILED: 08/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|----------------------------------|----------------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/666,595 | PHILOFSKY, ELLIOTT MALCOLM | |
| | Examiner Eric W Thomas | Art Unit 2831 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 07 June 2004.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-13 and 21-23 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-13 and 21-23 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 07 June 2004 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ . |

INTRODUCTION

The examiner acknowledges, as recommended in the MPEP, the applicant's submission of the amendment dated 6/7/04. At this point, claims 1, 4-7 have been amended; claims 14-20 have been cancelled; and claims 21-23 have been added. Thus claims 1-13, 21-23 are pending in the instant application.

DETAILED ACTION

Drawings

1. The drawings were received on 6/7/04. These drawings are approved by the examiner.

Claim Objections

2. Claims 1, 10 are objected to because of the following informalities:

Claim 1, line 4, change "electrod" to --electrode--. Appropriate correction is required.

Claim 10 recites the limitation "the BCTZ" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 6 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in

the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The claim limitation, "the second nickel electrode is a base for solder to be reflowed to form the bump" is not supported in the specification. If the solder forms the bump (please note the figures) then the solder would electrically connect the first and second electrodes together (as seen in fig. 2, fig. 3 step 6, and fig. 4 step 6)

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by Lueng et al. (US 5,563,762).

Lueng et al. disclose in fig. 3, 4, a capacitor for an integrated circuit, comprising: a first electrode (220); a dielectric (230) adjacent to the first electrode; and a second electrode (234) adjacent the dielectric, wherein the first electrode, the dielectric, the second electrode are all contained within a bump of the integrated circuit.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over McMillan et al. (US 6,404,003) in view of Uemoto et al. (US 2001/0019874).

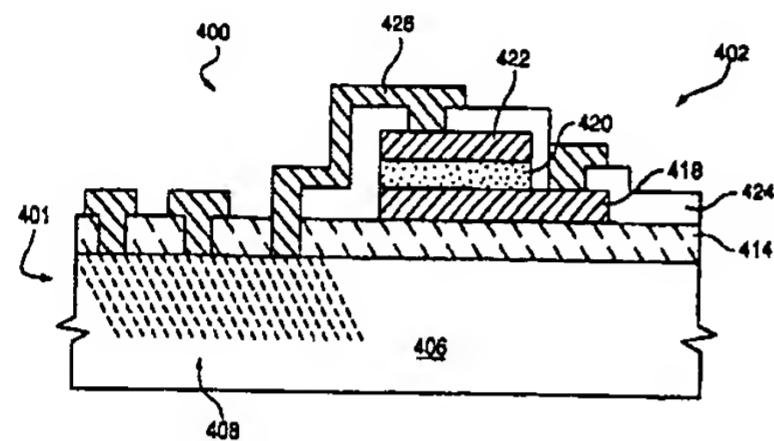


FIG. 4

McMillan et al. disclose in fig. 4, a capacitor comprising a first nickel electrode (col. 2 lines 59-63 – 418), a BCTZ dielectric (420 – col. 5 lines 20-40), and a second electrode (422) sandwiching the BCTZ, wherein the first nickel electrode, the BCTZ dielectric and the second electrode are contained within a bump of an integrated circuit.

McMillan et al. disclose the claimed invention except for the second electrode is formed from a nickel.

Uemoto et al. teach that it is known in the capacitor art to form electrodes from nickel.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the top electrode of McMillan et al. using a nickel material as taught by Uemoto et al., since nickel is an inexpensive material that has good electrical conductivity.

Regarding claim 2, McMillan et al. disclose the BCTZ contains one hundred atoms of barium per zero atoms of calcium (or BaTiZrO₃ – as suggested in col. 5 lines 25-40).

Regarding claim 3, McMillan et al. disclose the claimed invention except for the BCTZ contains eighty two to ninety atoms of titanium for each ten to eighteen atoms of zirconium. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the BCTZ to contain eighty two to ninety atoms of titanium for each ten to eighteen atoms of zirconium, since it has been held that, where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding claim 4, McMillan et al. disclose the first nickel electrode is adjacent to a lead (as illustrated in fig. 4 – not labeled).

McMillan et al. do not disclose that the lead is formed from an aluminum material. It should be noted that McMillan et al. teach that a lead connected to the second electrode is formed from an aluminum material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the lead connected to the first electrode from an aluminum material, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice, and aluminum is an inexpensive material. *In re Leshin*, 125 USPQ 416.

Regarding claim 5, McMillan et al. disclose the second electrode is electrically connected to a second aluminum lead (426) on the integrated circuit.

9. Claims 1, 2, 4, and 5, are rejected under 35 U.S.C. 103(a) as being unpatentable over Leung et al. (US 5,563,762) in view of Duncombe et al. (US 2003/0085447) and Uemoto et al. (US 2001/0019874).

Leung et al. disclose in fig. 3 (4), a capacitor comprising a first electrode (128,220), a dielectric (130,230) covering a side of the first electrode and a second electrode sandwiching the dielectric layer, wherein the first electrode, the dielectric and the second electrode are contained within a bump of an integrated circuit.

Leung et al. disclose the claimed invention except for the electrodes are formed from nickel.

Uemoto et al. teach that it is known in the capacitor art to form electrodes from nickel.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the top electrode of Leung et al. using a nickel material as taught by Uemoto et al., since nickel is an inexpensive material that has good electrical conductivity.

Leung et al. disclose the claimed invention except for the dielectric is formed from BCTZ.

Duncombe et al. teach the use of a barium zirconium titanate (BCTZ when there are one hundred atoms of barium to zero atoms of calcium).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the dielectric of Leung et al. using a barium zirconium titanate (BCTZ when there are one hundred atoms of barium to zero atoms of calcium)

as taught by Duncombe et al., since barium zirconium titanate would provide the capacitor with a material that has a high dielectric constant.

Regarding claim 2, Duncombe et al. teach the use of a barium zirconium titanate (BCTZ when there are one hundred atoms of barium to zero atoms of calcium).

Regarding claim 4, the modified Leung et al. disclose the first nickel electrode (as modified by Uemoto et al.) is adjacent to an aluminum (104,124, 204-- col. 8 line 50-55) lead on the integrated circuit.

Regarding claim 5, the modified Leung et al. disclose the second nickel (as modified by Uemoto et al.) is electrically connected to a second aluminum lead on the integrated circuit (106,124,206,222).

10. Claim 6, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Leung et al. (US 5,563,762), Duncombe et al. (US 2003/0085447) and Uemoto et al. (US 2001/0019874) as applied to claim 5 above, and further in view of Matsunaga (JP-55166947).

The modified Leung et al. disclose the claimed invention except for the second electrode (nickel electrode) is a base for a solder bump.

Matsunaga teaches (fig. 2) that it is common in the art to form a solder bump on an electrode support.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the capacitor of the modified Leung et al. by forming a solder bump on the upper electrode as taught by Matsunaga, since such a modification

would provide the capacitor of Leung et al. with an external connect with a material that has a low cost.

Regarding the limitation, “solder to be reflowed” is a method of forming the device. The method of forming the device is not germane to the issue of patentability of the device itself. Therefore, this limitation has not been given patentable weight.

11. Claims 7, 9-11, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leung et al. (US 5,563,762) in view of Uemoto et al. (US 2001/0019874).

Leung et al. disclose in fig. 3 (4), a capacitor for an integrated circuit a first electrode coupled to an electrical lead of the integrated circuit (104,124, 204), a dielectric (130,230) applied to the first electrode a second electrode applied to the dielectric and electrically attached to a second electrical lead of the integrated circuit (106,126, 206,222), wherein the first electrode, the dielectric and the second electrode are contained within a bump of the integrated circuit.

Leung et al. disclose the claimed invention except for the electrodes are formed from nickel.

Uemoto et al. teach that it is known in the capacitor art to form electrodes from nickel.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the top electrode of Leung et al. using a nickel material as taught by Uemoto et al., since nickel is an inexpensive material that has good electrical conductivity.

Lueng et al. disclose the claimed invention except for the capacitor is a decoupling capacitor. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

Regarding claim 9, Lueng et al. disclose a portion of the second electrode is deposited on a passivation layer (116, 216).

Regarding claim 10, Lueng et al. disclose (as seen in figs. 1 & 2), an insulator (24, 44) is applied to the edge of the dielectric (20,40).

Regarding claim 11, Lueng et al. disclose (as seen in figs. 1 & 2), the insulator (24,44) is applied to a portion of the first electrode (18, 38).

Regarding claim 22, Leung et al. disclose the claimed invention except for the electrodes are formed from nickel.

Uemoto et al. teach that it is known in the capacitor art to form electrodes from nickel.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the top electrode of Leung et al. using a nickel material as taught by Uemoto et al., since nickel is an inexpensive material that has good electrical conductivity.

12. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leung et al. (US 5,563,762) in view of Duncombe et al. (US 2003/0085447).

Leung et al. disclose the claimed invention except for the dielectric is formed from BCTZ.

Duncombe et al. teach the use of a barium zirconium titanate (BCTZ when there are one hundred atoms of barium to zero atoms of calcium).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the dielectric of Leung et al. using a barium zirconium titanate (BCTZ when there are one hundred atoms of barium to zero atoms of calcium) as taught by Duncombe et al., since barium zirconium titanate would provide the capacitor with a material that has a high dielectric constant.

13. Claims 12-13 rejected under 35 U.S.C. 103(a) as being unpatentable over Leung et al. (US 5,563,762) and Uemoto et al. (US 2001/0019874) as applied to claim 7 above, and further in view of Hashemi et al. (US 5,049,979).

Leung et al. (as modified by Uemoto et al.) disclose the claimed invention except for a layer of aluminum is applied over the second nickel electrode.

Hashemi et al. (fig. 2) teach that it is common to apply an aluminum material over the second electrode of a capacitor.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the capacitor of Leung et al. applying an aluminum material over the second electrode as taught by Hashemi et al., since such a modification would provide a bonding pad surface so as to allow for external connections to the capacitor (using bonding wires).

Regarding claim 13, Hashemi et al. teach that a wire lead is connected to the layer of aluminum.

Response to Arguments

14. Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric W Thomas whose telephone number is 571-272-1985. The examiner can normally be reached on M,Tu,Sat 9 am - 9:30 pm; W, Th, F 6 pm -10:00 pm.

Art Unit: 2831

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dean Reichard can be reached on 571-272-1984. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CJ2
8/7/04

Eric W Thomas
Examiner
Art Unit 2831

ewt